

## DAVIS DIAMONDS GYMNASTICS GIRLS' TRAINING PLAN

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The girls of the Davis Diamonds Gymnastics Junior Olympic Team have individualized conditioning programs that change approximately every eight weeks. These individual conditioning plans are an integral part of the overall training plan for our girls' Junior Olympic Team and must complement the actual gymnastics training and competitions. The basis for these conditioning programs is what we know about gymnastics and the individual needs of each gymnast based on tests and coaches' evaluations.

### WHAT WE KNOW ABOUT GYMNASTICS - What determines gymnastics performance?

Factors that largely determine the performance in competition of a gymnast, or performance determining factors (PDF), can be identified with physiological, biomechanical, and mathematical analysis of competitions. Scientists identify which factors, for example sprinting speed during vaulting or Difficulty Value for uneven bars, are related to judges' scores and thereby with success in competition. To a certain degree, we can predict results when we know the factors. As you might expect, these factors are very different at Junior Olympic Level 2 than 10. The factors change with performance level. Certainly, other factors play a role, but not with the strength of the PDFs. The PDFs in gymnastics are

- coordination (the ability to learn, maintain, adapt, and perform skills)
- muscle power to body mass ratio (light but strong)
- flexibility (passive more importantly active joint range of motion)
- training volume (amount of practice in hours or repetitions)
- the degree of mastery of the performance of certain, basic skills that are keys to advanced skills
- the degree of integration of the physical abilities and the technique of the gymnast
- related to the power-to-body-mass ratio is the optimum amount of muscle hypertrophy of the important muscle groups relative to the explosive strength of these same muscles.

## The Performance Determining Factors of Womens' Gymnastics

1. Coordination is the first, most important performance determining factor (PDF) because of the multitude and diversity of movements that must be learned, perfected, performed in competition, adapted to different events, equipment, and choreography, as well as maintained over time, with relatively little practice.
2. The athlete's muscle power-to-body weight ratio is the second most important PDF because she must lift her own body mass, in some cases with relatively small muscles. For maximum personal performance, muscle size must be minimized at the same time as strength is maximized.
3. In the training plan, the biological and physiological processes must take first priority, for example over economic, social, or pedagogical issues. This is difficult in practice because the training plan has to be adjusted to, among others, the school calendar. In other words, the cycle of fatigue, recovery, improvement must take priority over vacation dates, academic exams, or the like.
4. Gymnastics is fundamentally a plyometric activity that exploits a stretch-shortening, reflex drive to muscle contraction, and is therefore also very hard on the support structures of the body (bones, tendons, ligaments, connective tissue), and therefore requires weightlifting as a preparatory and complementary activity. Without weightlifting exercise, the body is not prepared for the enormous forces of take-offs, blocks, releases and catches, swings, and landings. Without weightlifting, the result will be both more traumatic injury as well as over-use injury. Weight lifting is the most efficient method of increasing the power-to- body-mass ratio.
5. The amplitude performed of certain skills directly contribute to the point total of the gymnast's score in competition. Moreover, a large range of motion in certain key joints (shoulders, hips, thorax) makes both learning and performing skills easier, faster, better, as well as safer. Therefore, joint flexibility is a PDF, both passive (gravity) and active (muscle effort).
6. The energy source is ATP and creatine phosphate metabolism, not glycolysis. Gymnastics is not an aerobic activity and an "aerobic base" has no meaning in gymnastics. There is also no significant accumulation of lactic acid, either during routine performance or over the course of a training session. The key to endurance and consistent performance in gymnastics is maximal strength.
7. Performance in gymnastics is highly influenced by the amount of practice (training volume). Training amount by itself is a PDF. However, the training should be "practice without repetition" instead of rote drill, a practice long ago discredited in education.

## PRACTICAL CONSEQUENCES FOR THE TRAINING PLAN

1. Certain movements are basic or key and their level of performance determine the ability of the gymnast throughout her career: lunge-handstand-lunge, back extension to handstand, forward take-offs, backward take-offs, and the six basic bar skills (kip cast to handstand, clear hip circle to handstand, late drop toe on, layout flyaway, forward pirouette, giants). These skills are hardly judged in competition but largely determine the performance of the high difficulty rated skills that follow. Therefore these basic skills become PDFs. However, they must be taught as leading and fundamental for elite gymnastics performance.
2. The conditioning must have dynamic correspondence with the skill technique. In other words, the resistance, type, and speed of the gymnastics and conditioning movements should be similar: high loads (concentric, eccentric, rapid, powerful stretch-shortening cycles), rapid rates of force development, short durations (with some large range of movement), skillful use of inertia, and muscle stretch-shortening.
3. In gymnastics, conditioning/physical fitness and skill performance are linked together. They are mutually dependent. The strength and flexibility of the gymnast determines how she will perform technically, and the technical aspects of a skill performance eventually influence how strength and flexibility develop as the skill is practiced. The degree and quality of integration of skill development and development of physical abilities is itself another PDF.
4. Emphasize muscle hypertrophy training before puberty and repeated explosive maximum force training after puberty. This will give the pre-puberal gymnast as much strength as possible to perform skills technically correctly then optimize the power to weight ratio of the post-puberal gymnast to perform skills technically correctly. The correct and timely emphasis of muscle hypertrophy and maximal explosive strength is a PDF.

## PERIODIZATION

The gymnast cannot always be in top shape otherwise she would never get tired enough to make fast and significant progress. Therefore the year must be divided into periods with different goals, and consequently, emphasis. Gymnasts in a periodized training program progress faster than gymnasts who are not "peaked" for the most important meets or have an "off-season". The Davis Diamonds program is based on the discovery in other sports that athletes progress faster with two competition periods per year. Therefore we have a Main Competition Period that ends with the most important

competition of the year and a Second Competition Period when the gymnasts test routines and preparation.

#### Junior Olympic Levels 2-4

##### Main Preparation Period: June-August

As soon as the school year ends, summer schedule begins with increased amount and intensity of practice. All gymnasts must be able to perform all of the skills of the level they intend to compete before this Main Preparation Period begins in June. The emphasis is on conditioning and routine development. Typical conditioning exercises would be bench press, chin-ups, stomach crunches, and toe raises.

##### Main Competition Period: September-November

This period begins with an Intra-Squad and ends with States. Every team member should qualify to State Championships. The emphasis is on increasing strength, speed, and flexibility in the routine performance. Typical conditioning exercises would be military press, bar dips, leg lifts, and toe raises

##### Transition Period: Thanksgiving to New Year

During the holidays attendance is reduced. The emphasis is on new skills and trampoline acrobatics. Conditioning is non-gymnastics specific, light, and playful.

##### Second Preparation Period: January-February

With the goal of testing progress of the new routines, or confirming the past level, learning new skills, combinations, and routines is emphasized. Gymnastics specific conditioning resumes. Typical conditioning exercises would be bench press, chin-ups, stomach crunches, and toe raises.

##### Second Competition Period: March-April

Practice includes more connections, routine parts, and some full routines. Without substantially reducing training, a few competitions give gymnasts and coaches valuable feedback and measure of progress. Typical conditioning exercises would be military press, bar dips, leg lifts, and toe raises.

#### Junior Olympic Level 5

Beginning when the school year ends in June, Level 5 gymnasts follow the Level 4 periodization plan until the end of the Main Competition Period in November. At this time they become optional level gymnasts (level 6-7).

Main Preparation Period: June-August

As soon as the school year ends, summer schedule begins with increased amount and intensity of practice. All gymnasts must be able to perform all of the skills of the level they intend to compete. The emphasis is on conditioning and routine development. Typical conditioning exercises would be bench press, chin-ups, stomach crunches, and toe raises.

Main Competition Period: September-November

This period begins with an Intra-Squad and ends with States. Every team member should qualify to State Championships. The emphasis is on increasing strength, speed, and flexibility in the routine performance. Typical conditioning exercises would be military press, bar dips, leg lifts, and toe raises.

Second Preparation Period: November - February

The emphasis is learning optional skills, connections, and routines as well as further development of strength, speed, coordination, and flexibility. Typical conditioning exercises would be bench press, chin-ups, stomach crunches, and toe raises.

Second Competition Period: March-April

2-3 competitions lead up to States and Regionals. Practice emphasizes routine performance and physical conditioning. Typical conditioning exercises would be military press, bar dips, leg lifts, and toe raises.

Second Preparation Period: May-June

The focus is on learning new acrobatic skills with trampolines, strap bar, and low beam. The conditioning is focused on weak areas, for example jumping strength, shoulder stiffness, or injured ankles. There is a lot of flexibility work and lower back- abdominal strength.

Junior Olympic Levels 7-10

First Preparation Period: June-August

As soon as the school year ends, summer schedule begins with increased amount and intensity of practice. Gymnasts move all of the skills of the level they intend to compete to the competition equipment, for example uneven bars or high beam. The emphasis is on conditioning and routine development. Typical conditioning exercises would be bench press, bicep curls, leg lifts, and toe raises.

Second Preparation Period: September-January

The emphasis is learning optional skills, connections, and routines as well as further development of strength, speed, coordination, and flexibility. Typical conditioning exercises would be military press, bar dips, leg lifts, dead lifts, and toe raises.

First Competition Period: January-March

This period begins with an Intra-Squad and ends with the last meet before States. Every team member should qualify to State Championships. The emphasis is on increasing strength, speed, and flexibility in the routine performance. Typical conditioning exercises would be military press, bar dips, leg lifts, dead lifts, and toe raises.

Second Competition Period: March - May

This period includes the most important competitions of the year: States, Regionals, Westerns, Nationals. Practice emphasizes routine performance and physical conditioning. Typical conditioning exercises would be military press, bar dips, leg lifts, dead lifts, and toe raises.

Transition Period: June

The focus is on learning new acrobatic skills with trampolines, strap bar, and low beam. The conditioning is focused on weak areas, for example jumping strength, shoulder stiffness, or injured ankles. There is a lot of flexibility work and lower back- abdominal strength. Attendance is reduced. Typical conditioning exercises would be bench press, bicep curls, leg lifts, and toe raises.

International Elite

First Preparation Period: October - April

This period emphasizes the parallel development of strength, speed, coordination, flexibility with new skills and connections. Conditioning is totally individualized.

Second Competition Period: April-May

The end of the JO Level 10 season is used to develop routine performance and experience. Conditioning is totally individualized.

Second Preparation Period: May-June

The focus is on routine upgrade and development, increasing both D and E scores. Conditioning is totally individualized.

Main Competition Period: July-October

This period includes the elite qualifiers, US Classics, and Visa Championships. Conditioning is completely individualized.

Transition Period: two weeks maximum. The gymnast is encouraged to do compensation exercise, for example swimming, running, hiking, bicycling, instead of gymnastics.